

What is claimed is:

1. An image processing method of producing visual image-referred data, comprising:

a large region and detail signal producing step of producing large region signals and detail signals by processing inputted-image data;

a storing step of storing at least the large region signals and the detail signals in a memory medium; and

an image processing step of obtaining the large region signals and the detail signals from the memory medium and producing visual image-referred data by applying an image processing process for the obtained large region and detail signals in order to optimize an visual image formation on an output medium.

2. The image processing method of claim 1, wherein the image processing step obtains the large region signals and the detail signals and produces revised-visual image-referred data by applying another image processing process for the obtained large region and detail signals.

3. The image processing method of claim 2, wherein the image processing step obtains the large region signals and the detail signals, produces another large region signals and another detail signals from the obtained large region and detail signals and produces revised-visual image-referred data from the another large region signals and the another detail signals.

4. The image processing method of claim 1, further comprising:

a converting process of applying a detail converting process for the detail signals to convert the detail signals into converted-detail signals and producing difference detail signal by using the detail signals and the converted-detail signals,

wherein the image processing step produces visual image-referred data from the large region signals and the converted-detail signals and the storing step stores the converted-detail signals, the difference detail signal and the visual image-referred data in the memory medium.

5. The image processing method of claim 1, wherein the large region and detail signal producing step produces input

luminance signals and input color signals by processing the inputted-image data and produces large region luminance signals and detail luminance signals instead of the large region signals and the detail signals, the storing step stores at least the large region luminance signals, the detail luminance signals and the input color signals in the memory medium, and the image processing step obtains the large region luminance signals, the detail luminance signals and the input color signals from the memory medium and produces visual image-referred data from the large region luminance signals, the detail luminance signals and the input color signals.

6. The image processing method of claim 5, further comprising:

a converting process of applying a detail converting process for the detail luminance signals to convert the detail luminance signals into converted-detail luminance signals and producing difference detail luminance signal by using the detail luminance signals and the converted-detail luminance signals,

wherein the image processing step produces visual image-referred data from the large region luminance signals,

the converted-detail luminance signals and the input color signals and the storing step stores the converted-detail luminance signals, the difference detail luminance signal and the visual image-referred data in the memory medium.

7. The image processing method of claim 5, further comprising:

a converting process of applying a color converting process for the input color signals to convert the input color signals into converted-input color signals and producing difference input color signal by using the input color signals and the converted-input color signals,

wherein the image processing step produces visual image-referred data from the large region luminance signals, the detail luminance signals and the converted-input color signals and the storing step stores the visual image-referred data, the converted-input color signals and the difference input color signal in the memory medium.

8. The image processing method of claim 1, wherein the large region and detail signal producing step produces color-converted input luminance signals and color-converted input color signals by conducting a color gamut converting process

for the inputted-image data and produces color-converted large region luminance signals and color-converted detail luminance signals instead of the large region signals and the detail signals, the storing step stores at least the color-converted large region luminance signals, the color-converted detail luminance signals and the color-converted input color signals in the memory medium, and the image processing step obtains the color-converted large region luminance signals, the color-converted detail luminance signals and the color-converted input color signals from the memory medium and produces visual image-referred data from the color-converted large region luminance signals, the color-converted detail luminance signals and the color-converted input color signals.

9. The image processing method of claim 8, further comprising:

a converting process of applying a converting process for the color-converted detail luminance signals to convert the color-converted detail luminance signals into color-converted converted-detail luminance signals and producing color-converted difference detail luminance signal by using

the color-converted detail luminance signals and the color-converted converted-detail luminance signals,

wherein the image processing step produces visual image-referred data from the color-converted large region luminance signals, the color-converted converted-detail luminance signals and the color-converted input color signals and the storing step stores the color-converted converted-detail luminance signals, the color-converted difference detail luminance signal and the visual image-referred data in the memory medium.

10. The image processing method of claim 8, further comprising:

a converting process of applying a converting process for the color-converted input color signals to convert the color-converted input color signals into color-converted converted-input color signals and producing color-converted difference input color signal by using the color-converted input color signals and the color-converted converted-input color signals,

wherein the image processing step produces visual image-referred data from the color-converted large region luminance signals, the color-converted detail luminance

signals and the color-converted converted-input color signals and the storing step stores the visual image-referred data, the color-converted converted-input color signals and the color-converted difference input color signal in the memory medium.

11. The image processing method of claim 1, further comprising:

a converting process of applying a converting process for the large region signals to convert the large region signals into converted-large region signals and producing difference large region signal by using the large region signals and the converted-large region signals,

wherein the image processing step produces visual image-referred data from the converted-large region signals and the detail signals and the storing step stores the converted-large region signals, the difference large region signal and the visual image-referred data in the memory medium.

12. The image processing method of claim 1, further comprising:

a converting process of applying a converting process for the large region signals to convert the large region signals into converted-large region signals and producing difference large region signal by using the large region signals and the converted- large region signals, and

a converting process of applying a converting process for the detail signals to convert the detail signals into converted-detail signals and producing difference detail signal by using the detail signals and the converted-detail signals,

wherein the image processing step produces visual image-referred data from the converted-large region signals and the converted-detail signals and the storing step stores the converted-large region signals, the difference large region signal, the converted-detail signals, the difference detail signal and the visual image-referred data in the memory medium.

13. The image processing method of claim 5, further comprising:

a converting process of applying a converting process for the large region luminance signals to convert the large region luminance signals into converted-large region

luminance signals and producing difference large region luminance signal by using the large region luminance signals and the converted-large region luminance signals,

wherein the image processing step produces visual image-referred data from the converted-large region luminance signals, the detail luminance signals and the input color signals and the storing step stores the converted-large region luminance signals, the difference large region luminance signal and the visual image-referred data in the memory medium.

14. The image processing method of claim 5, further comprising:

a converting process of applying a converting process for the large region luminance signals to convert the large region signals into converted-large region luminance signals and producing difference large region luminance signal by using the large region luminance signals and the converted-large region luminance signals, and

a converting process of applying a converting process for the detail luminance signals to convert the detail luminance signals into converted-detail luminance signals and producing difference detail luminance signal by using the

detail luminance signals and the converted-detail luminance signals,

wherein the image processing step produces visual image-referred data from the converted-large region luminance signals, the converted-detail luminance signals and the input color signals and the storing step stores the converted-large region luminance signals, the difference large region luminance signal, the converted-detail luminance signals, the difference detail luminance signal and the visual image-referred data in the memory medium.

15. The image processing method of claim 5, further comprising:

a converting process of applying a converting process for the large region luminance signals to convert the large region signals into converted-large region luminance signals and producing difference large region luminance signal by using the large region luminance signals and the converted-large region luminance signals, and

a converting process of applying a converting process for the input color signals to convert the input color signals into converted-input color signals and producing

difference input color signal by using the input color signals and the converted-input color signals,

wherein the image processing step produces visual image-referred data from the converted-large region luminance signals, the detail luminance signals and the converted-input color signals and the storing step stores the converted-large region luminance signals, the difference large region luminance signal, the converted-input color signals, the difference input color signal and the visual image-referred data in the memory medium.

16. The image processing method of claim 8, further comprising:

a converting process of applying a converting process for the color-converted large region luminance signals to convert the color-converted large region luminance signals into color-converted converted-large region luminance signals and producing color-converted difference large region luminance signal by using the color-converted large region luminance signals and the color-converted converted-large region luminance signals,

wherein the image processing step produces visual image-referred data from the color-converted converted-large

region luminance signals, the color-converted detail luminance signals and the color-converted input color signals and the storing step stores the color-converted converted-large region luminance signals, the color-converted difference large region luminance signal and the visual image-referred data in the memory medium.

17. The image processing method of claim 8, further comprising:

a converting process of applying a converting process for the color-converted large region luminance signals to convert the color-converted large region signals into color-converted converted-large region luminance signals and producing color-converted difference large region luminance signal by using the color-converted large region luminance signals and the color-converted converted-large region luminance signals, and

a converting process of applying a converting process for the color-converted detail luminance signals to convert the color-converted detail luminance signals into color-converted converted-detail luminance signals and producing color-converted difference detail luminance signal by using

the color-converted detail luminance signals and the color-converted converted-detail luminance signals,

wherein the image processing step produces visual image-referred data from the color-converted converted-large region luminance signals, the color-converted converted-detail luminance signals and the color-converted input color signals and the storing step stores the color-converted converted-large region luminance signals, the color-converted difference large region luminance signal, the color-converted converted-detail luminance signals, the color-converted difference detail luminance signal and the visual image-referred data in the memory medium.

18. The image processing method of claim 8, further comprising:

a converting process of applying a converting process for the color-converted large region luminance signals to convert the color-converted large region signals into color-converted converted-large region luminance signals and producing color-converted difference large region luminance signal by using the color-converted large region luminance signals and the color-converted converted-large region luminance signals, and

a converting process of applying a converting process for the color-converted input color signals to convert the color-converted input color signals into color-converted converted-input color signals and producing color-converted difference input color signal by using the color-converted input color signals and the color-converted converted-input color signals,

wherein the image processing step produces visual image-referred data from the color-converted converted-large region luminance signals, the color-converted detail luminance signals and the color-converted converted-input color signals and the storing step stores the color-converted converted-large region luminance signals, the color-converted difference large region luminance signal, the color-converted converted-input color signals, the color-converted difference input color signal and the visual image-referred data in the memory medium.

19. The image processing method of claim 1, wherein the large region signals are composed of a low frequency component of the inputted image data and the detail signals are composed of a high frequency component of the inputted image data.

20. The image processing method of claim 1, wherein the large region signals are composed on a low frequency component and an edge component of the inputted image data and the detail signals are composed of a component of a high frequency component of the inputted image data from which an edge component is deducted.

21. The image processing method of claim 1, wherein the large region signals and/or the detail signals are produced by applying a frequency band separating process for the inputted image data.

22. The image processing method of claim 1, wherein the large region signals and/or the detail signals are produced by applying a wavelet conversion processing for the inputted image data.

23. The image processing method of claim 11, wherein the converting process applied to the large region signals is a gradation converting process.

24. The image processing method of claim 23, wherein the gradation converting process is a nonlinear conversion process.

25. The image processing method of claim 5, wherein the large region luminance signals are composed of a low frequency component of the input luminance data and the detail signals are composed of a high frequency component of the input luminance data.

26. The image processing method of claim 5, wherein the large region luminance signals are composed of a low frequency component and an edge component of the input luminance data and the detail luminance signals are composed of a component of a high frequency component of the input luminance data from which an edge component is deducted.

27. The image processing method of claim 5, wherein the large region luminance signals and/or the detail luminance signals are produced by applying a frequency band separating process for the inputted image data.

28. The image processing method of claim 5, wherein the large region luminance signals and/or the detail luminance signals are produced by applying a wavelet conversion processing for the inputted image data.

29. The image processing method of claim 13, wherein the converting process applied to the large region luminance signals is a gradation converting process.

30. The image processing method of claim 29, wherein the gradation converting process is a nonlinear conversion process.

31. The image processing method of claim 8, wherein the color-converted large region luminance signals are composed of a low frequency component of the color-converted input luminance data and the color-converted detail signals are composed of a high frequency component of the color-converted input luminance data.

32. The image processing method of claim 8, wherein the color-converted large region luminance signals are composed of a low frequency component and an edge component of the

color-converted input luminance data and the color-converted detail luminance signals are composed of a component of a high frequency component of the color-converted input luminance data from which an edge component is deducted.

33. The image processing method of claim 8, wherein the color-converted large region luminance signals and/or the color-converted detail luminance signals are produced by applying a frequency band separating process for the color-converted input luminance signals.

34. The image processing method of claim 8, wherein the color-converted large region luminance signals and/or the color-converted detail luminance signals are produced by applying a wavelet conversion processing for the color-converted input luminance signals.

35. The image processing method of claim 16, wherein the converting process applied to the color-converted large region luminance signals is a gradation converting process.

36. The image processing method of claim 29, wherein the gradation converting process is a nonlinear conversion process.

37. The image processing method of claim 1, wherein the visual image-referred data has a dependence to the characteristic of an output device.

38. The image processing method of claim 1, wherein the signals and data are stored in a separate file in the memory medium.

39. The image processing method of claim 1, wherein the signals and data are stored in the same file in the memory medium.

40. The image processing method of claim 1, wherein at least one of the signals and data is stored as meta data in the same file in the memory medium.

41. The image processing method of claim 1, wherein a plurality of signals and data are stored in the same memory medium.

42. The image processing method of claim 1, wherein a plurality of signals and data are stored in different memory mediums.

43. The image processing method of claim 1, wherein at least one of a plurality of signals and data are stored together with an application capable of compiling image in the same memory medium.

44. The image processing method of claim 1, wherein at least one of a plurality of signals and data are stored together with a file to supplement an application capable of compiling image in the same memory medium.

45. The image processing method of claim 1, further comprising:

an additional information processing step of processing additional information provided with the inputted-image data,
wherein the large region and detail signal producing step determines a condition to produce the large region signals and the detail signals based on the additional information.

46. The image processing method of claim 45, wherein the large region and detail signal producing step produces large region luminance signals and detail luminance signals instead of the large region signals and the detail signals based on the additional information.

47. The image processing method of claim 46, wherein the additional information processing step judges the kind of color space of the inputted-image data from the additional information and the large region and detail signal producing step produces color-converted large region luminance signals and color-converted detail luminance signals instead of the large region signals and the detail signals based on the kind of color space.

48. The image processing method of claim 45, wherein the large region and detail signal producing step changes the characteristic of low-pass filter based on the additional information.

49. An image processing device for producing visual image-referred data, comprising:

a large region and detail signal producing section for producing large region signals and detail signals by processing inputted-image data;

a storing section for storing at least the large region signals and the detail signals in a memory medium; and

an image processing section for obtaining the large region signals and the detail signals from the memory medium and producing visual image-referred data by applying an image processing process for the obtained large region and detail signals in order to optimize an visual image formation on an output medium.

50. A program to conduct an image processing method of producing visual image-referred data, the image processing method comprising:

a large region and detail signal producing step of producing large region signals and detail signals by processing inputted-image data;

a storing step of storing at least the large region signals and the detail signals in a memory medium; and

an image processing step of obtaining the large region signals and the detail signals from the memory medium and producing visual image-referred data by applying an image

processing process for the obtained large region and detail signals in order to optimize an visual image formation on an output medium.